



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/828,739	04/20/2004	Pierre Giauque	06618-424002	5479
20985	7590	12/20/2005		
FISH & RICHARDSON, PC		EXAMINER		
P.O. BOX 1022		MCDONALD, RODNEY GLENN		
MINNEAPOLIS, MN 55440-1022		ART UNIT	PAPER NUMBER	1753

DATE MAILED: 12/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/828,739	GIAUQUE ET AL.
	Examiner Rodney G. McDonald	Art Unit 1753

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 12 October 2005.
 2a) This action is **FINAL**. 2b) This action is non-final.
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 1-4 is/are pending in the application.
 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
 5) Claim(s) _____ is/are allowed.
 6) Claim(s) 1-4 is/are rejected.
 7) Claim(s) _____ is/are objected to.
 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.
 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) <input type="checkbox"/> Notice of References Cited (PTO-892)	4) <input type="checkbox"/> Interview Summary (PTO-413)
2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)	Paper No(s)/Mail Date. _____ .
3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ .	5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)
	6) <input type="checkbox"/> Other: _____ .

DETAILED ACTION

Claim Rejections - 35 USC § 112

Claims 1-4 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 is indefinite because "TMO_x" is unclear. Should it be TmO_x?

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsu et al. (U.S. Pat. 6,294,420) in view of Summerfelt et al. (U.S. Pat. 5,622,893).

Regarding claim 1, Tsu et al. teach forming an electrically conductive material comprising providing a wafer of Si. (Column 7 line 18) Tsu et al. teach forming a first insulating material on the silicon substrate. (Column 5 lines 64-68; Column 6 lines 1-5) Tsu et al. teach forming a conductive layer 22 on the first material. (Column 4 lines 34-35) The first conductive layer can be a nitride or oxide. The oxide can be Pd-Si-O or Ru-Si-(O,N). (Column 4 lines 35-58) A ferroelectric layer can be formed on the conductive layer 22 directly connected to it. The ferroelectric material can be barium strontium titanate, strontium titanate, and lead zirconium titanate. (Column 5 lines 12-22) The device can be heated in ozone (i.e. oxidizing environment) at about 270 degrees C for about 10 minutes. (Column 7 lines 36-37)

Regarding claim 2, the first material is dielectric material. (Column 5 lines 64-68; Column 6 lines 1-5)

The differences between Tsu et al. and the present claims is that the conductive layer consisting essentially of three materials forming a ternary oxide material having first and second immiscible compounds, the first and second immiscible compounds having one common element, wherein the first compound is of the form TmO_x where Tm is a transition metal that is one of Ru, Mo, Rh, Os, Re, W, Cr, Ti, In or Ir and the second compound is of the form J_{Oy} where J is a different material than Tm and the first and second compounds being formed in an amorphous state and being meta-stable relative to one another over a temperature range, and wherein the common element is oxygen is not discussed (Claim 1), where the electrical material is formed by sputtering in an oxygen containing gas at least one target containing distinct sites of ruthenium

and silicon (Claim 3) and wherein the transition metal is an amorphous combination of ruthenium dioxide and silicon dioxide is not discussed (Claim 4).

Regarding the conductive layer consisting essentially of three materials forming a ternary oxide material having first and second immiscible compounds (Claim 1), the first and second immiscible compounds having one common element, wherein the first compound is of the form TmO_x where Tm is a transition metal that is one of Ru, Mo, Rh, Os, Re, W, Cr, Ti, In or Ir and the second compound is of the form JO_y where J is a different material than Tm and the first and second compounds being formed in an amorphous state and being meta-stable relative to one another over a temperature range, and wherein the common element is oxygen, Tsu et al. teach the same material as Applicant's material (i.e. a ternary oxide) and therefore it is believed that the claimed material is suggested. (i.e. *Ru-Si-(O,N)*) The transition metal is Ru. The second component is Si. Oxygen is common to the two components. (See Tsu et al. discussed above) Furthermore, Summerfelt et al. suggest that Pd-Si-O can be thought of as very small Pd particles in a SiO_2 matrix. (Column 6 lines 59-64) The Pd-Si-O can be formed by reactively sputtering using a PdSi target in a $O_2 + Ar$ ambient at 10 mTorr with the substrate not heated. (Column 8 lines 1-3) Since Summerfelt et al. teach forming the Pd-Si-O by reactive sputtering a metallic target of PdSi it would be obvious that a metallic target of Ru and Si can be sputtered to produce a ternary film. Since the process for forming is the same then the ternary film would inherently have the property of being in an amorphous state and being meta-stable relative to one another over a temperature range.

The motivation for producing a ternary oxide film is that allows for producing a film with good barrier properties yet allows current passage. (Column 6 lines 64-68)

Regarding the electrical material formed by sputtering in an oxygen containing gas at least one target containing distinct sites of ruthenium and silicon (Claim 3), Summerfelt et al. teach forming Pd-Si-O by reactive sputtering in oxygen. (Column 8 lines 1-3) Summerfelt et al. also teach forming the layers by reactive sputtering a metallic target. (Column 15 lines 15-21) Therefore one of ordinary skill in the art would recognize that sputtering a metallic target of Ru and Si would be obvious.

The motivation for reactive sputtering is that it allows formation oxide layers. (Column 7 lines 68; Column 8 lines 1-3)

Regarding the transition metal is an amorphous combination of ruthenium dioxide and silicon dioxide, Tsu et al. discussed above teach depositing a film of Ru-Si-O and since Summerfelt et al. teach the same process to produce the films (i.e. plasma sputtering) it is believed that Tsu et al. when using sputtering will result in an amorphous combination of ruthenium dioxide and silicon dioxide. (See Tsu et al. and Summerfelt et al. discussed above)

The motivation for producing a ternary oxide film is that allows for producing a film with good barrier properties yet allows current passage. (Column 6 lines 64-68)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Tsu et al. by utilizing a conductive layer consisting essentially of three materials forming a ternary oxide material having first and second immiscible compound and sputtering in an oxygen containing gas at least one

target containing distinct sites of ruthenium and silicon as taught by Summerfelt et al. because it allows for producing a film with good barrier properties yet allows current passage and for formation of oxide layers.

Response to Arguments

Applicant's arguments filed October 12, 2005 have been fully considered but they are not persuasive.

In response to the argument that the prior art of record does not teach the electrically conductive layer as claimed, Tsu et al. suggest a ternary layer of Ru-Si-O and Summerfelt et al. suggest a method of making such a ternary layer. Since the method of making (i.e. sputtering to form the ternary layer) is the same as Applicant it is believed that the layer will have Applicant's properties (i.e. being amorphous).

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rodney G. McDonald whose telephone number is 571-272-1340. The examiner can normally be reached on M- Th with Every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X. Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Rodney G. McDonald
Primary Examiner
Art Unit 1753

RM
December 12, 2005